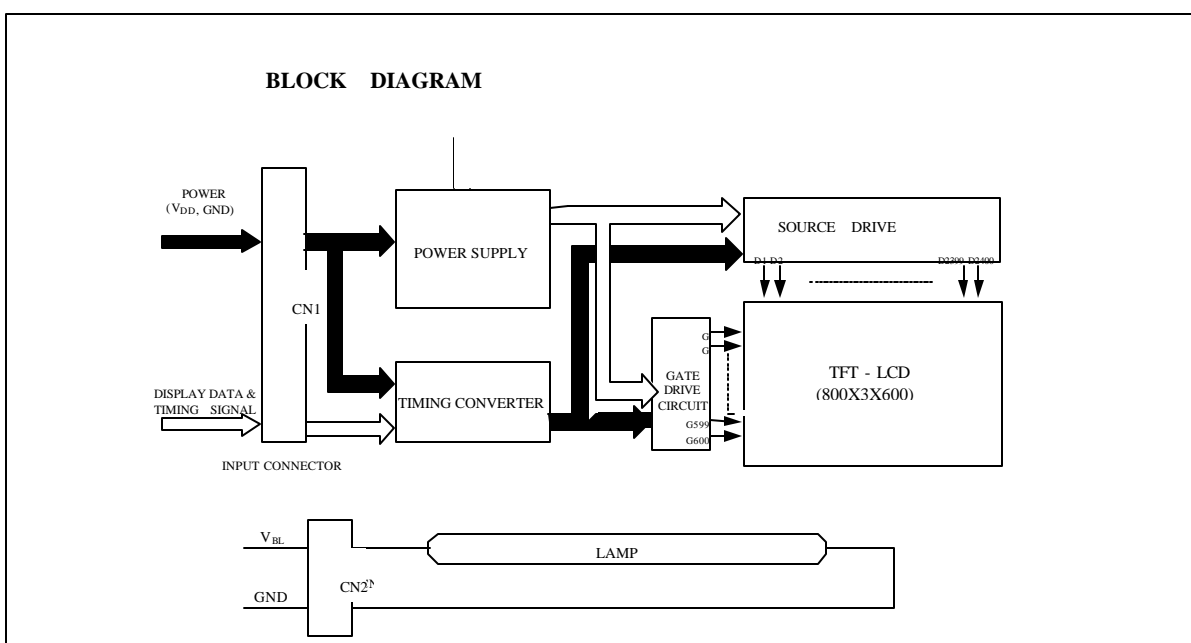


EXHIBIT J

Product General Specification
1. General Description

The LG.Philips LCD Co.,Ltd. LP121S4 LCD is a Color Active Matrix Liquid Crystal Display with an integral Cold Cathode Fluorescent Tube(CCFT) back light system. The matrix employs aSi Thin Film Transistor as the active element. It is a transmissive type display operating in the normally white mode. This TFTLCD has a 12.1 inch diagonally measured active display area with SVGA resolution(600 vertical by 800 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 6bit gray scale signal for each dot, thus, presenting a pallet of more than 262,144 colors.

The LP121S4 LCD is intended to support applications where low power consumption, weight and thickness are critical factors and graphic displays are important. In combination with the vertical arrangement of the sub-pixels, the LP121S4 characteristics provide an excellent flat panel display for office automation products such as portable computers.


General Display Characteristics

The following are general feature of the model LP121S4 LCD;

Active display area	12.1 inches(30.75cm) diagonal
Outsize dimensions	261 W x 199 H x 6.0 D mm Typ.
Pixel pitch	0.3075 mm x 0.3075 mm
Pixel format	800 horiz. By 600 vert. pixels
	RGB stripe arrangement
Color depth	6-bit
Display operating mode	Transmissive mode, normally white
Surface treatment	Hard coating(3H), Anti-glare treatment of the front polarizer


Product General Specification

2. Electrical Specifications

2-1. Electrical Characteristics

The LP121S4 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input which powers the CCFL, is typically generated by an inverter. The inverter is an external unit to the LCD.

Table 1 ELECTRICAL CHARACTERISTICS:

Parameter	Symbol	Values			Units	Notes
		Min.	Typ.	Max.		
MODULE:						
Power Supply Input Voltage	V _{DD}	3.0	3.3	3.6	V _{dc}	1
Power Supply Input Current	I _{DD}	215	235	265	m A	
Ripple/Noise	-	-	50	-	m V	
Logic Input Level, High	V _{IH}	0.6V _{DD}	-	V _{DD}	V _{dc}	1
Logic Input Level, Low	V _{IL}	-	-	0.3V _{DD}	V _{dc}	
Power Consumption	P _c	0.71	0.77	0.88	W	
LAMP						
Operating Voltage	V _L	595(6mA)	630(5mA)	715(3mA)	V _{rms}	2
Operating Current	I _L	3.0	5.0	6.0	m A	3
Established Starting Voltage	V _s					
at 25.		-	-	960	V _{rms}	
at 0.		-	-	1280	V _{rms}	4
Operating Frequency	F _L	45	55	80	kHz	
Discharge Stabilization Time	T _s			3	Minutes	
Power Consumption	P _L	2.15	3.15	3.57	W	6
Life Time			-		Hours	7
		10,000		-		I _L =6mA rms

Note)The design of the inverter must have specifications for the lamp in LCD Assembly.

The performance of the Lamp in LCM,for example life time or brightness is extremely influenced by the characteristics of the DC-AC Inverter. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter.

When you design or order the inverter, please make sure unwanted lighting caused by the mismatch of the lamp and the inverter(no lighting,flicker,etc) never occurs. When you confirm it,the LCD Assembly should be operated in the same condition as installed in your instrument.

Notes: 1. The current draw and power consumption specified is for 3.3 Vdc at 25.and 38.5MHz (at 64 Gray pattern displayed).

2. The variance of the voltage is $\pm 10\%$.

3. The voltage above V_s should be applied to the lamps for more than 1second for start-up.

Otherwise, the lamps may not be turned on.

4. The output of the inverter must have symmetrical(negative and positive) voltage waveform and symmetrical current waveform.(Unsymmetrical ratio is less than 10%) Please do not use the inverter which has unsymmetrical voltage and unsymmetrical current and spike wave. Lamp frequency may produce interference with horizontal synchronous frequency and as a result this may cause beat on the display. Therefore lamp frequency shall be as away as possible from the horizontal synchronous frequency and from its harmonics in order to prevent interference.

5.Let's define the brightness of the lamp after being lighted for 5 minutes as 100%.

T_s is the time required for the brightness of the center of the lamp to be not less than 95%.

6. The lamp power consumption shown above does not include loss of external inverter.

7. The life time is determined as the time at which brightness of lamp is 50% compared to that of initial value at the typical lamp current on condition of continuous operating at 25 ± 2 .

2-2. Interface Connections

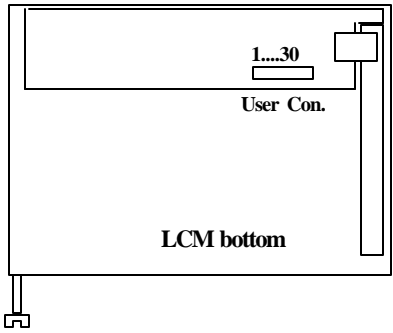

Product General Specification

This LCD employs two interface connections, a 30 pin connector is used for the module electronics and a two pin connector is used for the integral backlight system.

The electronics interface connector is a model 55177-3091, manufactured by MOLEX.

The pin configuration for the connector is shown in the table below.

Table 3 MODULE CONNECTOR PIN CONFIGURATION

Pin	Symbol	Description	Notes
1	GND	Ground	see Note 1 LCD SIDE CONNECTOR : 55177-3091(MOLEX) SYSTEM SIDE CONNECTOR : 1) Wire type :51146-3000(MOLEX) 2) FPC type : 54281-3010(MOLEX)  < REAR VIEW >
2	DCLK	Main clock	
3	GND	Ground	
4	Hsync	Horizontal sync.	
5	Vsync	Vertical sync.	
6	DTMG	Data timing signal	
7	GND	Ground	
8	R0	Red data	
9	R1	Red data	
10	R2	Red data	
11	R3	Red data	
12	R4	Red data	
13	R5	Red data	
14	GND	Ground	
15	G0	Green data	
16	G1	Green data	
17	G2	Green data	
18	G3	Green data	
19	G4	Green data	
20	G5	Green data	
21	GND	Ground	
22	B0	Blue data	
23	B1	Blue data	
24	B2	Blue data	
25	B3	Blue data	
26	B4	Blue data	
27	B5	Blue data	
28	GND	Ground	
29	V _{DD}	Power input	
30	V _{DD}	Power input	

Notes: 1. All GND(ground) pins should be connected together which should also be connected to the LCD's metal frame.

2. All V_{DD}(power input) pins should be connected together.

The backlight interface connector is a model BHSR-02VS-1, manufactured by JST. The mating connector part number is SM02B-BHSS-1-TB or equivalent. The pin configuration for the connector is shown in the table below.

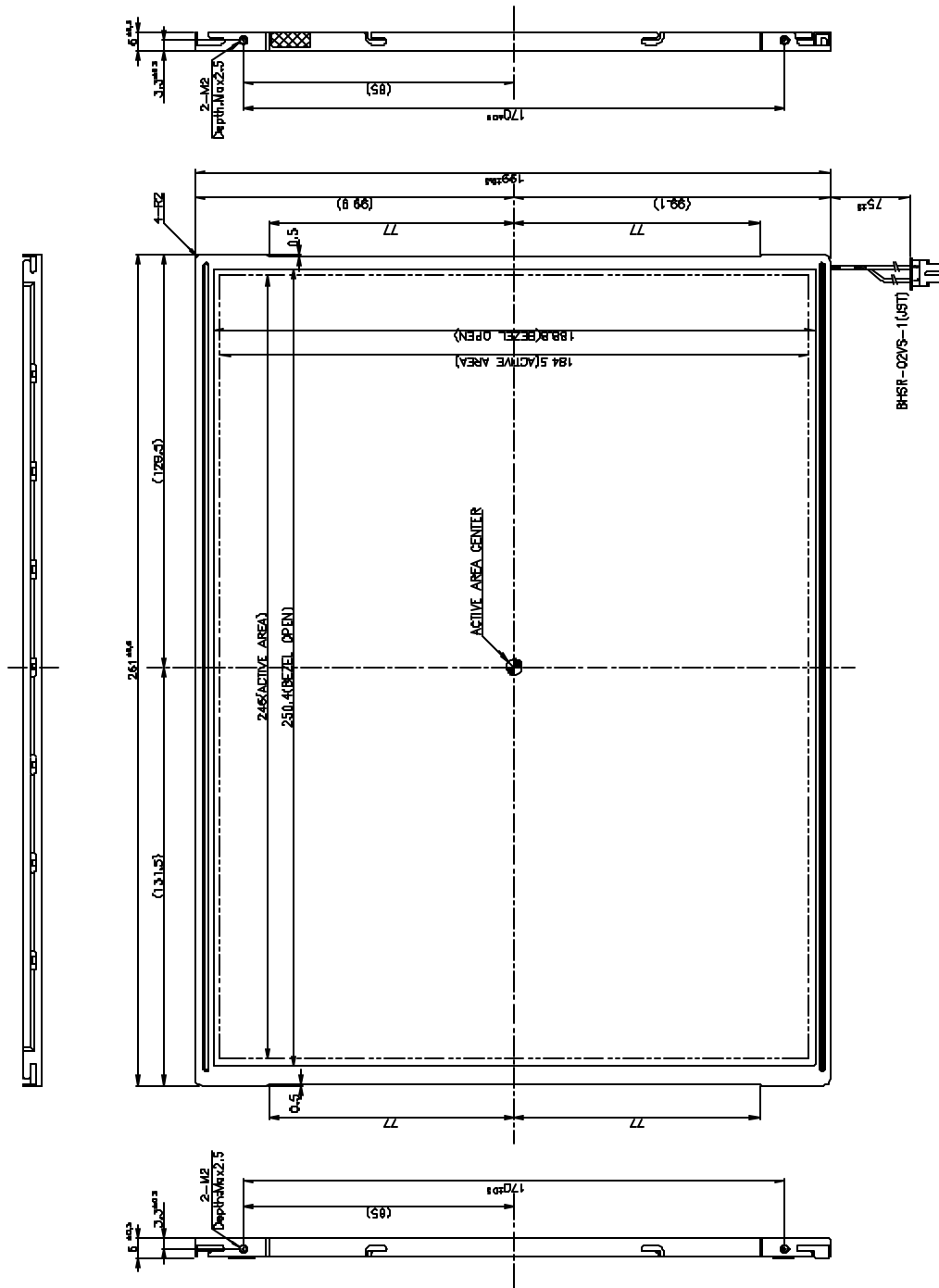
Table 5 BACKLIGHT CONNECTOR PIN CONFIGURATION

Pin	Symbol	Description	Notes
1	HV	Lamp power input	1
2	LV	Ground	

Notes: 1. The input power terminal is colored pink. Ground pin color is black.

< LCM FRONT SIDE >

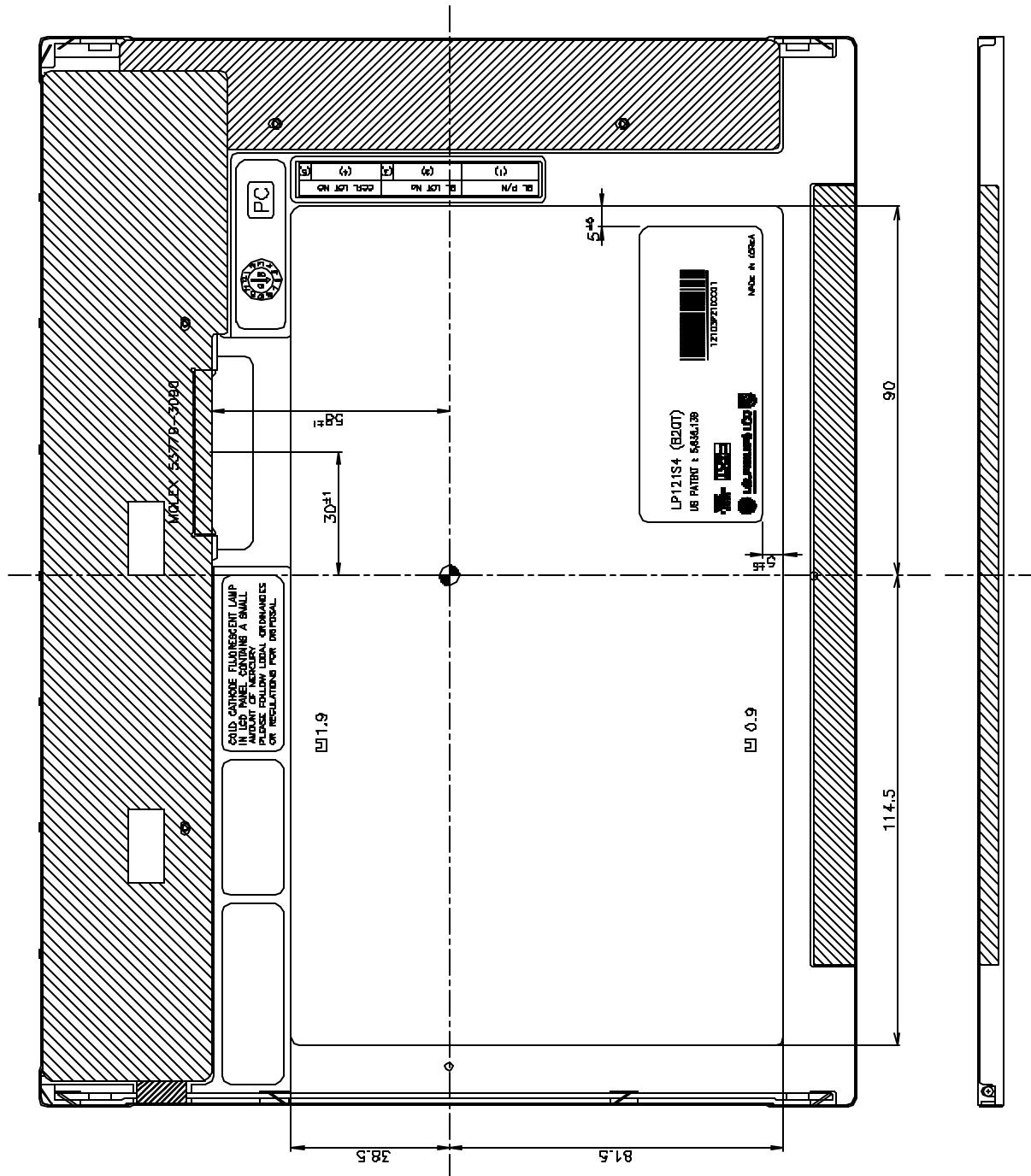
Product General Specification



Notes 1. Unspecified dimensional tolerance are $\pm 0.5\text{mm}$

2. Screw Torque : 1.3-1.5kgf.

< LCM BACK SIDE >



**Product General Specification****3.PRECAUTIONS**

The LCD Products listed on this documents are not suitable for use of Military, Industry, Medical etc. system.

If customers intend to use these LCD products for above application, Please contact ours sales people in advance.